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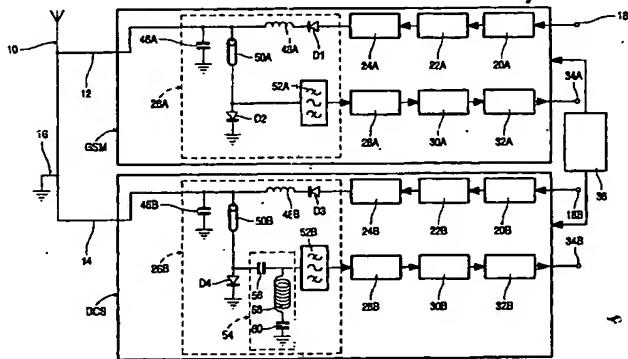
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(54) Title: IMPROVEMENTS IN OR RELATING TO WIRELESS TERMINALS



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(57) Abstract: A wireless terminal having a dual band antenna arrangement which comprises a planar inverted-F antenna (10) having a first feed (12) for signals in a first, lower frequency band, for example the GSM band, a second feed (14) for signals in a second, higher frequency band, for example the DCS band, and a ground pin (16). A first coupling stage (26A) couples the transmit and receive paths of a first transceiver (GSM) to the first feed and a second coupling stage (26B) couples the transmit and receive paths of a second transceiver (DCS) to the second feed. Each of the first and second coupling stages comprise a quarter wavelength transmission line (50A, 50B) having a first end coupled to the respective transmit signal path and a second end coupled by band pass filter (52A, 52B) to the respective receive signal path. A first PIN diode (D1, D3) couples a transmit signal path to the first end of the respective quarter wavelength transmission line and to the respective feed (12, 14) and a second PIN diode (D2, D4) couples the second end of the respective quarter wavelength transmission line to ground. In operation when transmitting in one of the bands, the first and second PIN diodes of the relevant coupling stage are switched-on, whilst the PIN diodes in the other coupling stage are off and when in a receiving mode all the PIN diodes are off. The signal being received by one of the transceivers is reflected by the band pass filter in the coupling stage of the other transceiver.

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A. CLASSIFICATION OF SUBJECT MATTER
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 823 751 A (NOKIA MOBILE PHONES LTD) 11 February 1998 (1998-02-11) column 6, line 14-38; figure 5 ----	1,5,6
Y	US 6 332 071 B1 (BRANDT PER-OLOF) 18 December 2001 (2001-12-18) the whole document ----	1,5,6
A	EP 1 187 357 A (HITACHI METALS LTD) 13 March 2002 (2002-03-13) page 1, line 19-23 page 9, line 14 -page 11, line 20; figures 15,17 page 2, line 18-48 ----	1,5,6

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0823751	A	11-02-1998	US	5768691 A	16-06-1998
			CN	1183013 A	27-05-1998
			EP	0823751 A2	11-02-1998
			JP	10093473 A	10-04-1998
			US	6115585 A	05-09-2000
US 6332071	B1	18-12-2001	SE	511749 C2	15-11-1999
			AU	753862 B2	31-10-2002
			AU	3963599 A	25-10-1999
			BR	9909467 A	11-06-2002
			CN	1304560 T	18-07-2001
			EE	200000582 A	15-02-2002
			EP	1078414 A1	28-02-2001
			JP	2002510925 T	09-04-2002
			SE	9801209 A	08-10-1999
			WO	9952172 A1	14-10-1999
EP 1187357	A	13-03-2002	EP	1187357 A1	13-03-2002
			CN	1364347 T	14-08-2002
			WO	0169807 A1	20-09-2001
			US	2002180556 A1	05-12-2002